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<110> Ludevid, Dolores
       Torrent, Margarita
       Alvarez, Inaki
       Perez, Pascual

<120> Amino acid-enriched plant protein reserves, particularly
       lysine-enriched maize gamma-zein, and plants expressing such
       proteins

<130> 50062/004001

<140> US 09/117,246
<141> 1998-12-03

<150> PCT/FR97/00167
<151> 1997-01-28

<150> FR96/01004
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<170> PatentIn version 3.3

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Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
            20   25   30

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Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
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Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
        50              55              60

cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg    240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65              70              75              80

cca cca tgc cac tac cct act caa ccg ccc cgg cct cag cct cat ccc    288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
                85              90              95

cag cca cac cca tgc ccg tgc caa cag ccg cat cca agc ccg tgc cag    336
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100             105             110

ctg cag gga acc tgc ggc gtt ggc agc acc ccg atc ctg ggc cag tgc    384
Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln Cys
            115             120             125

gtc gag ttt ctg agg cat cag tgc agc ccg acg gcg acg ccc tac tgc    432
Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr Cys
    130             135             140

tcg cct cag tgc cag tcg ttg cgg cag cag tgt tgc cag cag ctc agg    480
Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu Arg
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cag gtg gag ccg cag cac cgg tac cag gcg atc ttc ggc ttg gtc ctc    528
Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val Leu
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cag tcc atc ctg cag cag cag ccg caa agc ggc cag gtc gcg ggg ctg    576
Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly Leu
            180             185             190

ttg gcg gcg cag ata gcg cag caa ctg acg gcg atg tgc ggc ctg cag    624
Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu Gln
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Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
        50                    55                    60


His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                    70                    75                    80


Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
                85                    90                    95


Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100                   105                   110


Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln Cys
            115                   120                   125


Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr Cys
    130                   135                   140


Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu Arg
145                   150                   155                   160


Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val Leu
                165                   170                   175


Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly Leu
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Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu Gln
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gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg      96
Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
                20                  25                  30

ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg     144
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
            35                  40                  45

cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc     192
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
        50                  55                  60

cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg     240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                  70                  75                  80

cca cca tgc cac tac cct act caa ccg ccc cgg atc gaa ttc aaa cca     288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Ile Glu Phe Lys Pro
                85                  90                  95

aag cca aag ccg aag cca aaa gaa ttc aaa cca aag cca aag ccg aag     336
Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys Pro Lys
                100                 105                 110

cca aaa gaa ttc ctg cag ccc ctg cag gga acc tgc ggc gtt ggc agc     384
Pro Lys Glu Phe Leu Gln Pro Leu Gln Gly Thr Cys Gly Val Gly Ser
        115                 120                 125

acc ccg atc ctg ggc cag tgc gtc gag ttt ctg agg cat cag tgc agc     432
Thr Pro Ile Leu Gly Gln Cys Val Glu Phe Leu Arg His Gln Cys Ser
    130                 135                 140

ccg acg gcg acg ccc tac tgc tcg cct cag tgc cag tcg ttg cgg cag     480
Pro Thr Ala Thr Pro Tyr Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln
145                 150                 155                 160

cag tgt tgc cag cag ctc agg cag gtg gag ccg cag cac cgg tac cag     528
Gln Cys Cys Gln Gln Leu Arg Gln Val Glu Pro Gln His Arg Tyr Gln
                165                 170                 175

gcg atc ttc ggc ttg gtc ctc cag tcc atc ctg cag cag cag ccg caa     576
Ala Ile Phe Gly Leu Val Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln
                180                 185                 190
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agc ggc cag gtc gcg ggg ctg ttg gcg gcg cag ata gcg cag caa ctg    624
Ser Gly Gln Val Ala Gly Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu
        195                 200                 205

acg gcg atg tgc ggc ctg cag cag ccg act cca tgc ccc tac gct gct    672
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            20              25              30

Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35              40              45

Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
    50              55              60

His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65                  70              75                  80

Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Ile Glu Phe Lys Pro
                85                  90                  95

Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys Pro Lys
            100             105             110

Pro Lys Glu Phe Leu Gln Pro Leu Gln Gly Thr Cys Gly Val Gly Ser
        115             120             125

Thr Pro Ile Leu Gly Gln Cys Val Glu Phe Leu Arg His Gln Cys Ser
    130             135             140

Pro Thr Ala Thr Pro Tyr Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln
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6

Gln Cys Cys Gln Gln Leu Arg Gln Val Glu Pro Gln His Arg Tyr Gln
            165   170   175

Ala Ile Phe Gly Leu Val Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln
            180   185   190

Ser Gly Gln Val Ala Gly Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu
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gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg   96
Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
            20   25   30

ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg   144
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35   40   45

cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc   192
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
    50   55   60

cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg   240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65   70   75   80

cca cca tgc cac tac cct act caa ccg ccc cgg cct cag cct cat ccc   288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
            85   90   95

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cag cca cac cca tgc ccg tgc caa cag ccg cat cca agc ccg tgc cag        336
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
            100                 105                 110

atc gaa ttc aaa cca aag cca aag ccg aag cca aaa gaa ttc ctg cag        384
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
            115                 120                 125

ccc ctg cag gga acc tgc ggc gtt ggc agc acc ccg atc ctg ggc cag        432
Pro Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln
        130                 135                 140

tgc gtc gag ttt ctg agg cat cag tgc agc ccg acg gcg acg ccc tac        480
Cys Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr
145                 150                 155                 160

tgc tcg cct cag tgc cag tcg ttg cgg cag cag tgt tgc cag cag ctc        528
Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu
                165                 170                 175

agg cag gtg gag ccg cag cac cgg tac cag gcg atc ttc ggc ttg gtc        576
Arg Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val
                180                 185                 190

ctc cag tcc atc ctg cag cag cag ccg caa agc ggc cag gtc gcg ggg        624
Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly
            195                 200                 205

ctg ttg gcg gcg cag ata gcg cag caa ctg acg gcg atg tgc ggc ctg        672
Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu
        210                 215                 220

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Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
        35                  40                  45
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His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
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Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
           85   90   95

Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
         100   105   110

Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
        115   120   125

Pro Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln
   130   135   140

Cys Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr
145   150   155   160

Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu
         165   170   175

Arg Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val
         180   185   190

Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly
        195   200   205

Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu
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Pro Lys

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Pro Lys Pro Lys
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Pro Lys Pro Lys Pro Lys Pro Lys Pro Lys Pro Lys Pro Lys
            20                  25                  30



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            20                  25                  30


Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
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<220>
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Lys Pro Lys Pro Lys Pro Lys Pro Lys Lys Pro Lys Pro Lys Pro Lys
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Pro Lys

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Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys
1   5   10   15

Pro Lys Pro Lys
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Pro Lys Pro Lys
1